

# **ASTRONOMY AND ASTROPHYSICS**

**A European Journal**

**Volume 227 1990**

**Published by Springer International on behalf of the Board of Directors**

# Astronomy and Astrophysics A European Journal

## Board of Directors

Chairman: G. Contopoulos (Greece)	A. G. Hearn (The Netherlands)	Aa. Sandqvist (Sweden)
Vice Chairman: G. Setti (Italy)	A. Maeder (Switzerland)	E. Schatzman (France)
D. Alloin (France)	K. Mattila (Finland)	E. H. Schröter (Germany, Federal Republic)
R. Canal (Spain)	P. G. Mezger (Germany, Federal Republic)	P. Smeyers (Belgium)
H. Haupt (Austria)	P. E. Nissen (Denmark)	H. van der Laan (ESO)

## Editors-in-Chief

J. Lequeux  
Astronomy and Astrophysics  
Editorial Office  
Observatoire de Meudon  
92 195 Meudon Principal Cedex  
(France)  
Tel. (31-1) 45-07-06-30  
Telex (42) 270912 obsastr

E-Mail:  
EARN AANDA @ FRMEU 51  
SPAN MESIOA::AANDA

M. Grewing  
Astronomy and Astrophysics  
Editorial Office  
c/o Astronomisches Institut  
Walhäuserstrasse 64  
7400 Tübingen  
(Fed. Rep. of Germany)  
Tel. (49-7071) 294982  
Telefax (49-07071) 293458  
Telex (41) 7262714 ait d  
E-Mail:  
DatexP 0262-45707130039  
SPAN AITMVX::AAPTUE

## Letter-Editor

S. R. Pottasch  
Kapteyn Astronomical Institute  
P. O. Box 800  
9700 AV Groningen  
(The Netherlands)  
Tel. (31-50) 634093  
Telex (44) 53572 stars nl  
Telefax (31-50) 634033

## Editing Secretaries

Miss B. Perche  
Mrs. M. Rougeot

Mrs. U. Hilkes

Mrs. B. J. Boersma-Reed

The exclusive copyright © for all languages and countries, including the right for photomechanical and any other reproduction, also in microform, is vested in European Southern Observatory (ESO).  
The use of registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Springer International 1990  
Printed in Germany  
Printers: Brühlsche Universitätsdruckerei, Giessen

## Contents

### Letters to the Editor

Hydrodynamic implications of particle fragmentation near cometary nuclei

*Keller, H.U., Marconi, M.L., Thomas, N.*

L1

Large dust particles around main sequence stars

*Chini, R., Krägel, E., Kreysa, E.*

L5

A merger model for SN 1987A

*Podsiadlowski, P., Joss, P.C., Rappaport, S.*

L9

HR 10: A new  $\beta$  Pictoris-like star?

*Lagrange-Henri, A.M., Beust, H., Ferlet, R., Hobbs, L.M., Vidal-Madjar, A.*

L13

WRA 751, a candidate for a new luminous blue variable

*Hu, J.Y., de Winter, D., Thé, P.S., Pérez, M.R.*

L17

Supernova 1987A at 1.3 mm

*Biermann, P.L., Chini, R., Greybe-Götz, A., Haslam, G., Kreysa, E., Mezger, P.G.*

L21

Rapid variations and a very deep minimum in the light curve of 3C 345

*Kidger, M.R., de Diego, J.A.*

L25

CO observations of very cold southern circumstellar shells and pre-planetary nebulae

*Loup, C., Forveille, T., Nyman, L.A., Omont, A.*

L29

Variability in the noise properties of Cygnus X-1

*Belloni, T., Hasinger, G.*

L33

Two wide-velocity H<sub>2</sub>O masers

*Forster, J.R.*

L37

### Cosmology

Identification of structures from galaxy counts: use of the wavelet transform

*Slezak, E., Bijaoui, A., Mars, G.*

301

Nonlinear structures of self-gravitating systems

*Xiao-Qing Li*

317

On the two-point correlations of galaxies in the CfA survey

*Börner, G., Mo, H.J.*

324

### Extragalactic astronomy

(RN) Superluminal motions with oblique shocks

*Fraix-Burnet, D.*

1

The far-infrared properties of Shapley-Ames S0 galaxies

*van Driel, W., de Jong, T.*

6

Isophotal contours of early-type galaxies. II. Axisymmetric-bulge and thin-disk approximations

*Simien, F., Michard, R.*

11

New radio maps and optical identifications of distant 3 CR galaxies

*Strom, R.G., Riley, J.M., Spinrad, H., van Breugel, W.J.M., Djorgovski, S., Liebert, J., McCarthy, P.J.*

19

Interactions between stars and gas in galactic nuclei

*Langbein, T., Spurzem, R., Fricke, K.J., Yorke, H.W.*

333

H<sub>2</sub> emission and CO absorption in Centaurus A: evidence for a circumnuclear molecular disk

*Israel, F.P., van Dishoeck, E.F., Baas, F., Koornneef, J., Black, J.H., de Graauw, T.*

342

VLA observations of low luminosity radio galaxies. VII. General properties

*de Ruiter, H.R., Parma, P., Fanti, C., Fanti, R.*

351

Constraints on the evolution of high-redshift galaxies and on  $q_0$  from faint galaxy counts

*Guiderdoni, B., Rocca-Volmerange, B.*

362

Detection of the 3.3  $\mu$ m feature in two starburst galaxies

*Dennefeld, M., Desert, F.X.*

379

The composite spectrum of quasars

*Cristiani, S., Vio, R.*

385

The molecular cloud content of early type galaxies. II. A molecular ring in NGC 404

*Wiklind, T., Henkel, C.*

394

Two new Seyfert galaxies from the IRAS Point Source Catalogue

*Pérez, E., Manchado, A., García-Lario, P., Pottasch, S.R.*

407

### Galactic structure and dynamics

(RN) "b-type" spheroids

*Busarello, G., Filippi, S., Ruffini, R.*

30

Galaxy kinematics and gravitation

*Dubal, M.R., Salucci, P., Persic, M.*

33

Complex instability of simple periodic orbits in a realistic two-component galactic potential

*Patsis, P.A., Zachilas, L.*

37

Application of the Prendergast method to a logarithmic potential

*Contopoulos, G., Seimenis, J.*

49

Global stochasticity in a time-dependent galactic model <i>Caranicolas, N.D.</i>	54	New observations of atomic line scattering around Betelgeuse <i>Mauron, N.</i>	141
The relativistic equilibrium configurations of systems of particles with a cutoff in their phase space distribution functions <i>Merafina, M., Ruffini, R.</i>	415	Absorption features in the infrared spectra of OH/IR stars: 3 $\mu$ m and 10 $\mu$ m spectroscopy of OH 138.0 + 7.3 <i>Smith, R.G., Herman, J.</i>	147
<b>Formation, structure and evolution of stars</b>		Temporal polarization variations of Be stars. V. Comments on the similar behaviour of $\gamma$ Cassiopeiae and $\kappa$ Draconis <i>Clarke, D.</i>	151
Surface-to-core temperature variation of homogeneously magnetized neutron stars <i>Schaaf, M.E.</i>	61	Spectrum analysis of five A-F giant stars <i>Berthet, S.</i>	156
Excitation of stellar oscillations by tidal processes <i>Beiki Ardkani, A., Sobouti, Y.</i>	71	Line formation in expanding atmospheres: the treatment of radiative equilibrium by approximate lambda operators, and its application to Wolf-Rayet stars <i>Hamann, W.-R., Wesselowski, U.</i>	171
(RN) 53 Piscium: peculiar amplitude modulation or transient variability? <i>Jerzykiewicz, M., Sterken, C.</i>	77	Investigation of micro-flaring and secular and quasi-periodic variations in dMe flare stars. III. Micro-variability of AT Mic following a stellar flare <i>Andrews, A.D.</i>	456
Carbon star envelopes: near-IR photometry, mass loss and evolutionary status of a sample of IRAS stars <i>Epcztein, N., Le Bertre, T., Lépine, J.R.D.</i>	82	The circumstellar dust envelopes of red giant stars. I. M giant stars with the 10 $\mu$ m silicate emission band <i>Hashimoto, O., Nakada, Y., Onaka, T., Tanabé, T., Kamijo, F.</i>	465
UBVRI photometry of the X-ray bursters V 801 Arae and UY Volantis <i>Schoenbs, R., Zoeschinger, G.</i>	105	Flaring interactions between accretion disk and neutron star magnetosphere <i>Aly, J.J., Kuijpers, J.</i>	473
(RN) Time-correlated archival flash search for the Soft Gamma Repeater 1806-20 <i>Greiner, J., Laros, J.G., Fenimore, E.E., Klebesadel, R.W.</i>	115	Flaring and quiescent X-rays from Castor <i>Pallavicini, R., Tagliaferri, G., Pollock, A.M.T., Schmitt, J.H.M.M., Rosso, C.</i>	483
The Wolf-Rayet star HD 211853 revisited <i>Panov, K.P., Seggewiss, W.</i>	117	Activity in late-type stars. V. Rotational modulation and flaring in UV lines on the most rapidly rotating dMe star, GI 890 (=BD-16°6218) <i>Byrne, P.B., McKay, D.</i>	490
A reflection model for the light curves of three symbiotic stars <i>Formiggini, L., Leibowitz, E.M.</i>	121	<b>Diffuse matter in space (including HII regions and planetary nebulae)</b>	
Simultaneous observations of the symbiotic star BF Cygni <i>Fernández-Castro, T., González-Riestra, R., Cassatella, A., Fuensalida, J.J.</i>	422	The evolution of superstructures expanding in differentially rotating disks <i>Palouš, J., Franco, J., Tenorio-Tagle, G.</i>	175
Non-equilibrium processes in the crust of an accreting neutron star <i>Haensel, P., Zdunik, J.L.</i>	431	EXOSAT observation toward S 147 and A 0535+26 <i>Sauvageot, J.L., Ballet, J., Rothenflug, R.</i>	183
Near-IR polaro-imaging of the "Frosty Leo nebula": clues for a recently ejected shell <i>Douglas, C., Rouan, D., Lacombe, F., Forveille, T., Tiphene, D.</i>	437	(RN) Molecular gas in M 2-9, the Butterfly nebula <i>Bachiller, R., Martin-Pintado, J., Bujarrabal, V.</i>	188
(RN) The emission region of Cygnus X-1 MeV gamma rays <i>Liang, E.P.</i>	447	Echelle observations of the multiple shells of the supernova remnant IC 443 <i>Meaburn, J., Whitehead, M.J., Raymond, J.C., Clayton, C.A., Marston, A.P.</i>	191
Ginga X-ray observations of two gamma-ray burst error boxes <i>Murakami, T., Nishimura, J., Kawai, N., Cooke, B.A., Katoh, M.</i>	451	Millimetre and submillimetre molecular line observations of the reflection nebula NGC 2023 <i>White, G.J., Sanderson, C., Monteiro, T.S., Richardson, K.J., Hayashi, S.S.</i>	200
<b>Stellar atmospheres</b>		The argon abundance in planetary nebulae <i>Ratag, M.A., Pottasch, S.R.</i>	207
(RN) Flare activity and orbital rotation of YY Gemnorum <i>Doyle, J.G., Mathioudakis, M.</i>	130	Abnormal extinction and pre-main sequence stars in M 16 (NGC 6611) <i>Chini, R., Wargau, W.F.</i>	213
Discovery of a highly ionized, low mass-loss wind and a corona seen in absorption in the G9 II star HR 6902 <i>Reimers, D., Baade, R., Schröder, K.-P.</i>	133		

Vibrationally excited ammonia in the Galaxy	
<i>Schilke, P., Mauersberger, R., Walmsley, C.M., Wilson, T.L.</i>	220
The interstellar medium in the solar vicinity: analysis of the distribution of colour excesses $E(b-y)$ towards 10 selected areas	
<i>Franco, G.A.P.</i>	499
Spatially resolved spectroscopy of WR ring nebulae. I. NGC 2359 and RCW 78	
<i>Esteban, C., Vilchez, J.M., Manchado, A., Edmunds, M.G.</i>	515
Polycyclic aromatic hydrocarbons in the near-infrared spectra of 24 IRAS sources	
<i>Jourdain de Muizon, M., d'Hendecourt, L.B., Geballe, T.R.</i>	526
Infrared and radio emission from very young and massive stellar objects	
<i>Henning, Th., Pfau, W., Altenhoff, W.J.</i>	542
An OH survey of Orion South and GMC 214-13	
<i>Jenniskens, P., Wouterloot, J.G.A.</i>	553
<b>The Sun</b>	
The absolute value and sign of the function $\alpha(r)$ in the force-free magnetic field modelling of photospheric observations	
<i>Cuperman, S., Ofman, L., Semel, M.</i>	227
A multiwavelength analysis of flare and surge activity and its relevance to energy transfer within AR 2779	
<i>Simnett, G.M., Sotirovski, P., Simon, G.</i>	235
Light and velocity visibility of solar g-mode oscillations	
<i>Berthomieu, G., Provost, J.</i>	563
Spectroheliograms and motions of magnetic tracers	
<i>Mein, P., Ribes, E.</i>	577
Extrapolation of photospheric potential magnetic fields using oblique boundary values: a simplified approach	
<i>Cuperman, S., Ofman, L., Semel, M.</i>	583
Spectropolarimetry of solar faculae: high spatial resolution results	
<i>del Toro Iniesta, J.C., Semel, M., Collados, M., Sánchez Almeida, J.</i>	591
<b>The solar system</b>	
Thermal behaviour of pure and dusty ices on comets and icy satellites	
<i>Kömle, N.I., Dettleff, G., Dankert, C.</i>	246
Orbital evolution of known asteroids in the $v_5$ secular resonance region	
<i>Scholl, H., Froeschlé, Ch.</i>	255
Out-of-ecliptic Lyman-alpha observations with Pioneer-Venus: solar wind anisotropy degree in 1986	
<i>Lallement, R., Stewart, A.I.</i>	600
Did an outburst occur on 4 December 1985 in Halley's comet?	
<i>Festou, M.C., Tozzi, G.P., Smaldone, L.A., Felenbok, P., Falciari, R., Zucconi, J.-M.</i>	609
Distant encounter between Keplerian particles	
<i>Hasegawa, M., Nakazawa, K.</i>	619
<b>Celestial mechanics and astrometry</b>	
Dynamics of Halley-like comets for 1 million years	
<i>Dvorak, R., Kribbel, J.</i>	264
<b>Physical and chemical processes</b>	
The p-process revisited	
<i>Rayet, M., Prantzos, N., Arnould, M.</i>	271
The mixing length parameter $\alpha$	
<i>Canuto, V.M.</i>	282
Electron-impact excitation from the $\text{Si}^{5+}$ ground state, using the R-matrix method	
<i>Mohan, M., Le Dourneuf, M.</i>	285
(RN) New determination of the radiative properties of the $4 p^2 P_{1/2,3/2}$ levels in aluminum and the $5 p^2 P_{1/2,3/2}$ levels in gallium	
<i>Buurman, E.P., Dönszelmann, A.</i>	289
Stark-broadening regularities of $np-nd$ transition arrays of nitrogen, oxygen, neon, and silicon ion spectral lines	
<i>Djeniže, S., Labat, J., Platiša, M., Srećković, A., Purić, J.</i>	291
Current sheets in two-dimensional potential magnetic fields. II. Asymptotic limits of indefinitely sheared force-free fields	
<i>Amari, T., Aly, J.J.</i>	628
<b>Instruments, data processing, and computational methods</b>	
The ESO differential image motion monitor	
<i>Sarazin, M., Roddier, F.</i>	294
Imaging using HURA coded apertures with discrete pixel detector arrays	
<i>Byard, K., Dean, A.J., Goldwurm, A., Hall, C.J., Harding, J.S.J., Lei, F.</i>	634
Laboratory images with HURA coded apertures	
<i>Goldwurm, A., Byard, K., Dean, A.J., Hall, C.J., Harding, J.S.J.</i>	640
An approximation of Chandrasekhar's $H$ -function for conservative isotropic scattering	
<i>Holubec, A., McConnell, J.C.</i>	649
<b>Papers accepted for publication in A. &amp; A.</b>	
	653